

WHAT IS CLAIMED IS:

1. A method of preparing a preform for a RTM molding process comprising the steps of:

forming a layer of reinforcing fibers;

applying a patterned discontinuous layer of a tackifier resin to at least one side of the layer of reinforcing fibers; and

curing the tackifier resin.

2. The method of claim 1 wherein the patterned discontinuous layer of tackifier resin is applied by a patterned roller.

3. The method of claim 1 wherein the patterned discontinuous layer of tackifier resin is applied by a release sheet.

4. The method of claim 1 wherein the patterned discontinuous layer of tackifier resin is applied by at least one spray nozzle.

5. The method of claim 1 wherein the layer of reinforcing fibers is selected from the group consisting of uni-directional fibers, bi-directional fibers and random mat.

6. The method of claim 1 wherein the tackifier resin is selected from the group consisting of thermosetting resin, thermoplastic resin, EM wave activated resin and self curing resin.

7. The method of claim 1 wherein the tackifier resin is applied in a quantity of about $\frac{1}{4}$ percent to about 10 percent of the areal weight of the reinforcing fiber.

20 8. The method of claim 1 wherein the tackifier resin is applied in a quantity of about 30 volume percent to about 40 volume percent.

9. The method of claim 1 wherein the patterned discontinuous layer is in the form of a herringbone pattern.

25 10. The method of claim 1 further comprising forcing an effective quantity of tackifier resin into an effective number of fibers.

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11. The method of claim 1 further comprising preparing the tackified reinforcing fibers for shipping.

12. The method of claim 11 wherein the tackified reinforcing fibers are wrapped onto a roll.

5 13. The method of claim 11 wherein the tackified reinforcing fibers are cut and stacked.

14. The preform for a RTM molding process produced by the method of claim 1.

15. An apparatus for applying a discontinuous pattern of a tackifier in the manufacture of a preform for a RTM molding process comprising:

a transport system, said system supporting a layer of reinforcing fibers, and an applicator positioned to apply an effective amount of the tackifier in a discontinuous pattern to at least one side of the layer of reinforcing fibers.

16. The apparatus of claim 15 wherein the applicator is a patterned roller comprising a patterned surface in contact with a side of the layer of reinforcing fibers, the patterned roller having a means for receiving an uninterrupted supply of tackifier.

17. The apparatus of claim 16 wherein the means for receiving the uninterrupted supply of tackifier is a supply roller having a surface in physical contact with a surface of the patterned roller, the supply roller surface having a means to receive an uninterrupted supply of tackifier from a tackifier resin supply source, such that the supply roller surface transfers an effective amount of tackifier to the patterned roller surface.

20 18. A method of preparing of preparing a fiber-reinforced composite article for use in a gas turbine engine, comprising the steps of:

25 forming a layer of reinforcing fibers;

applying a patterned discontinuous coating of adhesive tackifier resin in a predetermined amount to at least one side of the layer of reinforcing fibers to form a tacky ply;

assembling a plurality of the plies to form a preform, the predetermined amount of adhesive tackifier resin being sufficient to maintain the assembled plies in a shape of the preform;
placing the preform into a mold; then
injecting a second resin in liquid form into the mold to form a continuous matrix of resin between and around the plies of the preform; and
curing the preform to form a near net shape article.

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